

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A system for detecting tissue contact and penetration depth comprising:

a needle with a first opening to a lumen of the needle and a second opening to the same lumen of the needle, said needle having the lumen extending between the first opening and the second opening, and the second opening including at least one aperture in the needle to the lumen located a predetermined distance from said first opening;

a fluid pressure measurement assembly coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly configured to measure a first pressure that is the pressure of said fluid as said fluid is dispensed through said needle at a constant rate, a second pressure that is a pressure change when said needle contacts said tissue and said first opening becomes occluded, and a third pressure that is a second pressure change when said needle penetrates said tissue and said aperture becomes occluded.

2. (Previously Presented) The system of claim 1 wherein said pressure measurement assembly comprises:

a fluid pressure sensor.

3. (Original) The system of claim 1 wherein said pressure of fluid includes a pressure of a therapeutic agent to be injected into said tissue.

4. (Canceled)

5. (Original) The system of claim 1 wherein said aperture has an area in said range between about 0.003 and 10 mm².

6. (Original) The system of claim 1 wherein said predetermined distance is a desired penetration depth of said needle into said tissue.

7. (Original) The system of claim 5 wherein said predetermined distance from said first end is about 0.5 to 10 millimeters.

8. (Original) The system of claim 1 wherein said first end of said needle has at least one of a tapered and untapered portion.

9. (Original) The system of claim 1 wherein said needle has an outer diameter in said range between about 0.008 and 0.26 inches.

10. (Original) The system of claim 1 wherein said needle has an inner diameter in said range between about 0.004 and 0.22 inches.

11. (Original) The system of claim 1 further comprises a computer processor coupling to said fluid pressure measurement assembly, said computer processor configured to perform at least one of determining and distinguishing said rate of changes in said static pressure to determine and distinguish said various penetration depths of said needle.

12. (Original) The system of claim 11 wherein said computer processor further couples to at least one of a visual feedback system indicator and an audible feedback system to issue human-recognizable signals as to penetration depths of said needle.

13-20. (Canceled)

21. (New) The system of claim 1 further comprising a signal processor or a computer processor coupled to the fluid pressure measurement assembly to differentiate the third pressure from the first pressure and from the second pressure by detecting the second pressure change when said needle penetrates said tissue said predetermined distance and said aperture becomes occluded.

22. (New) The system of claim 1 further comprising a circuit to differentiate between: (1) a first pressure indicating that the needle has not reached the tissue; (2) a second pressure indicating that the needle has penetrated the tissue and the first opening has become occluded; and (3) a third pressure indicating that the needle has penetrated the tissue by the predetermined distance and that the aperture is occluded.

23. (New) The system of claim 22 further comprising:
a visual indicator or an audible feedback system to indicate that the needle has not reached the tissue when the first pressure is measured;
to indicate that the needle has penetrated the tissue and the first opening has become occluded when the second pressure is measured; and
to indicate that the needle has penetrated the tissue by the predetermined distance when the third pressure is measured.
24. (New) The system of claim 22 wherein the first opening is in a tip of the needle.